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| 10/540,698 | 06/24/2005 | Balakrishnan Srinivasan | NL 021333 | 8947 |

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P.O. BOX 3001
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| EXAMINER |
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FONG, VINCENT

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| ART UNIT | PAPER NUMBER |
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2183

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06/05/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/540,698 | Applicant(s) SRINIVASAN ET AL. | |
| | Examiner Vincent Fong | Art Unit 2183 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-13 is/are pending in the application.
- 4a) Of the above claim(s) 2 and 3 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>03-20-2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the amendment filed on 03-20-2007.

Claims 1,4,5,7,9,10 and 12 have been amended.

Claims 2 and 3 have been cancelled.

Claims 1 and 4-13 are rejected.

Claims 1 and 4-13 are pending and have been examined.

Claim Objections

1. Claim 12 is objected to because of the following informalities: The limitation "the respective register" lack antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 11 is rejected under 35 U.S.C. 102(b) as being anticipated by Berenbaum et al. (EP 1139215 A2, hereinafter Berenbaum).

As per claim 11, Berenbaum discloses:

Method of processing data in a VLIW processor, comprising the steps: registering whether a functional unit is idle or operating (state machine); and indicating to said

VLIW controller (issue logic) whether said functional unit is idle or operating (paragraph 0013).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4-10 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berenbaum in view of Corporaal (MOVE32INT Architecture and programmer's reference manual).

As per claim 1, Berenbaum discloses:

A VLIW processor (paragraph 0012) comprising a plurality of functional units , each for executing an operation (figure 6), and a VLIW controller (the issue logic) connected to each of said functional units and adapted to control said functional units characterized by at least one indication means (state machine) associated with one of said functional units and adapted to register and indicate to the VLIW controller whether said one functional unit is idle or operating (paragraph 0013).

Berenbaum does not disclose the indication means comprises an input register (TI1) and output register and a presence bit.

However, Corporaal discloses said indication means comprises an input register (TI1) for inputting data to said one functional unit (INT1) and an output register (RI1) for

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receiving data output from said one functional unit, said input and output register each comprising a presence bit (SI0, SI1) indicative of the presence or absence of data in the respective register (Page 53 paragraph 3, page 57 block diagram, page 58 lock request).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to have make the necessary modification on Berenbaum inventions to incorporate Corporaal inventions. One of ordinary skill in the art would be motivated to modify Berenbaum inventions to increase hardware efficiency and flexibility in implementation and functionality (page 12 section 2.6).

As per claim 4, rejection of claim 1 is incorporated and Corporaal further discloses: said input register (trigger register) is adapted to trigger the execution of the operation by said one functional unit, if data is present in the input register (page 4 paragraph 5).

As per claim 5, rejection of claim 1 is incorporated and Corporaal further discloses: indication means comprises an input register file having a plurality of said input registers (TCX, OCX) and an output register file having a plurality of said output registers (X, NX) (page 63 block diagram).

As per claim 6, rejection of claim 5 is incorporated and Corporaal further discloses:

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the input register file (trigger register) is adapted to trigger the execution of the operation by said one functional unit, if a predetermined number of the input registers contain data (one register, when trigger register contain data) (page 4 paragraph 5).

As per claim 7, rejection of claim 1 is incorporated and Corporaal further discloses: a temporary register (TCX) for storing data to be used repeatedly by said one functional unit (always used by the attached functional unit) , said temporary register being connected to said one functional unit (page 63 block diagram).

As per claim 8, rejection of claim 5 is incorporated and Corporaal further discloses: the output register file (when result of current functional unit is used in a second functional unit, the move from output register to trigger register is locked until output register show valid data) is adapted to trigger (when operation unlock, the transfer will be executed and trigger operation in a second integer functional unit) the execution of the operation of a second functional unit, if a predetermined number of output registers contain data (1 output register will need to contain valid data) (page 10 section 2.4, page 58 lock request).

As per claim 9, rejection of claim 1 is incorporated and Berenbaum further discloses: said one functional unit has a variable long latency; depending what instruction a functional unit is executing, the latency can be 2 cycles for MUL and 1 cycles for ADD (paragraph 0021, figure 6 and 7).

As per claim 10, rejection of claim 1 is incorporated and Berenbaum discloses the limitations of claim 1.

Berenbaum does not disclose the latency of the at least one of the one functional unit depends on the data to be processed by said functional unit.

However Corporaal discloses the latency of the at least one of the one functional unit depends on the data to be processed by said functional unit (page 25 table 4.3); interger unit which process 32 bit data has latency of 3 while immediate unit which process 6 bit data has latency of 0.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to have make the necessary modification on Berenbaum inventions to incorporate Corporaal inventions. One of ordinary skill in the art would be motivated to modify Berenbaum inventions to increase hardware efficiency and flexibility in implementation and funcationality (page 12 section 2.6).

As per claim 12, rejection of claim 11 is incorporated and Berenbaum discloses the limitation of claim 11.

Berenbaum does not disclose the steps registering whether said one functional unit receives data for executing its operation and whether said one functional unit outputs data after executing its operation and the presence bit in the register.

However Corporaal discloses the steps registering whether said one functional unit receives data for executing its operation (SI1) and whether said one functional unit

outputs data after executing its operation (SI2)(Page 6 figure 2.6, Page 53 paragraph 3, page 57 block diagram, page 58 lock request), said registering comprising a presence bit indicative (SI1, SI2) of the presence or absence of data in respective register.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to have make the necessary modification on Berenbaum inventions to incorporate Corporaal inventions. One of ordinary skill in the art would be motivated to modify Berenbaum inventions to increase hardware efficiency and flexibility in implementation and functionality (page 12 section 2.6).

As per claim 13, rejection of claim 12 is incorporated and Corporaal further discloses: the steps of indicating to the VLIW controller (bus control unit) that the functional unit receives data, and indicating to the VLIW controller that the functional unit outputs data (interger unit locking and unlocking condition) (Page 6 figure 2.6, Page 53 paragraph 3, page 57 block diagram, page 58 lock request).

Response to Amendment

6. Applicant's arguments filed 03-20-2007 have been fully considered but they are not persuasive. In remarks, the applicant argues in substance:

(1) Bernbaum (EP 11392215) fails to disclose added elements in amended claims 1 and 11, also in original claim 9 (which depends on amended claim 1).

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(2) Corporaal does not disclose the input registers in now cancelled claim 3, which has been incorporated into claim 1.

Response

(1) Applicant's arguments are moot as the claim 1 are amended and is rejected under new ground of rejection. And claim 11 are not amended to include the subject matter recited in claim 3 despite the remarks made by the applicant.

(2) The trigger register (T11) in the prior art is comparable to the input register recited in the amended claim 1. The trigger register (T11) receives data (T11:=src) then the data is input into the logic (2 cycle logic) to compute the result (R11:= T11+O11) [page 57, page 58 in particular supported operations].

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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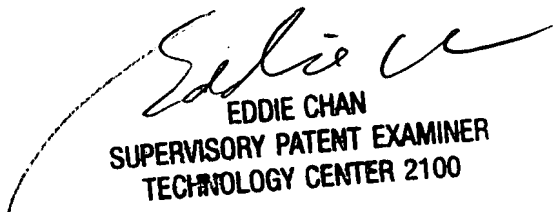
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vincent Fong whose telephone number is 571-270-1409. The examiner can normally be reached on 7:00-3:30 Mon - Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on 571-272-4162. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

VF
Vincent Fong
May 26 2007


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